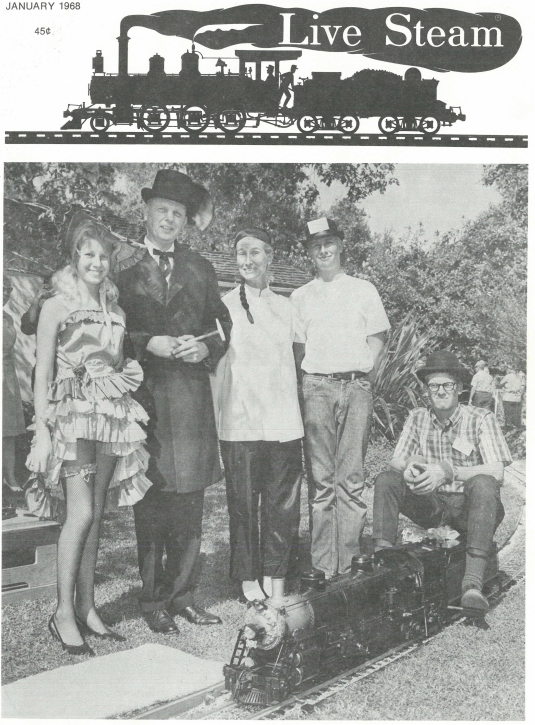
JANUARY 1968

45¢

# Live Steam



GENE HASKLEY

Live Steam
magazine

JANUARY 1968 VOL. 2 NO. 1

CONTENTS

2 *Live Steam is a Family Affair*

4 *Club News*
*New Products*
*Scheduled Meets*

5 *So You Want To Build A Live Steam Locomotive*

8 *5th Anniversary in the 50th State*

9 *Orange Empire Trolley Museum Begins Live Steam Runs*

10 *Mail Stop*

11 *... from the cupola*

COVER PHOTO. The Reiter Family ready to receive guests at the Golden Spike Ceremony. Melissa as the Gay 90's Girl, The Doctor in top hat, Barbara as No. 1 Coolie and Tim and Ken with engineers derbys give proof that "Live Steam is a Family Affair!!"

Published monthly by
William C. Fitz
Post Office Box 635
Cadillac, Michigan 49601

SUBSCRIPTIONS start with January, May or September issue. $4.50 per year in U.S.A. and Canada, (U. S. Funds) $5.50 per year (U. S. Funds) in other countries.

COPYRIGHT © 1968 LIVE STEAM All rights reserved. This magazine or parts thereof may not be reproduced in any form withuut permission in writing from the publisher. Printed in U.S.A.

CHANGE OF ADDRESS. Post offices will not forward this magazine unless you provide extra postage. To insure receiving your next copy, send your new address promptly along with your old address to LIVE STEAM, P. O. Box 635, Cadillac, Michigan 49601.

# Live Steam is a FAMILY AFFAIR

by Gene Hackley and Arthur W. Reiter, M.D.

The SWIMMING POOL & TENNIS COURT RAILROAD was dedicated in a traditional Golden Spike Ceremony on September 10, 1967 in Arcadia, California, as the climax of months of work by the family and friends of Arthur W. Reiter, M.D.

Art entered the hobby in 1962 and built an inch-scale, kerosene-fired Frisco Pacific which he completed in 1965 and ran on the Los Angeles Live Steamers' track. Sadly, experience showed that his medical practice and other obligations frequently caused intervals of 3 to 4 months between steaming sessions and no ardent Live Steamer can be content to endure such long periods of inactivity.

So the Reiters bought another house on an acre-plus, a few blocks from the former hillside location and moved in June 1966. Planning began promptly and by Christmas, sons Ken and Tim and their friends began grading the right-of-way.

Track construction began in April. Red cedar and redwood ties were predrilled for roofing nail spikes and immersed 24 hours in creosote. Rails were bent to the desired radius and the track was assembled on the shop floor in 20 to 40 foot sections. The radius was held to close limits by working over a chalk line.

Sandy subgrade was stabilized with plowed-in asphalt emulsion and tamped. (To prevent smashed toes, have your sons wear stout shoes... the President of the new road should limit himself to supervision at this stage.)

Track was ballasted with #5 crushed granite since local experience showed that round pea gravel is less satisfactory than sharp crushed rock which binds together under only brief use to stop tie motion. Bolt holes in rail ends and fish plates were drilled oversize and the fish plates greased to provide for expansion at each rail joint. No sun kinks have occured to date.

Wife Barbara repaired 200 feet of used track and fabricated 150 feet of new track and with practice could spike a 10-foot section in 30 minutes. As an encore she painted all of the railroad's right-of-way and station signs. Daughter Melissa got into the act, too, laying track and spreading ballast.

Turnouts were bench assembled with two 1/8 x 1" steel splints screwed to the underside of the ties. Grades on the SP&TC range up to 1.7%. Radii are generally 30-35 feet with one broad curve, but the Orange Grove curve is built on a 28'6" radius. Track gauge is opened up to 4-7/8" on the tighter curves to permit operation of locomotives with a long rigid wheelbase.

The completed SP&TC Division of the Frisco Lines boasts 800 feet of track, 640 of which is main line. There are 6 switches and passion for reversing. A gratifying feature of the engine terminal is an elevator permitting waist-level steaming and light repairs. Engines move through an opening in the shop wall to a transport dolly or the storage rack, or are lowered to ground level to run. Typical of the crash program to complete the railroad on schedule, the elevator was assembled by Bill Divine and Bert Henning under a full moon at 1:00 a.m.!

Golden Spike Day was clear and hot. Family, friends, LALS and Pasadena Model Railroad Club (HO) members comprised a staff of 30 who put on the show. Many participants were costumed to recapture the May 10, 1869 setting of the classic Golden

Spike Ceremony at Promontory Point, Utah. Master of Ceremonies, Harry Gruwell, introduced D. R. Lewis, Assistant to the Vice President (Operations) of the Southern Pacific Company, who graciously welcomed the new competitor. . .particularly since the SP&TC is primarily a passenger road! Tom Crawford, President of the LALS, spoke briefly and Dr. Reiter outlined the origins of the road which is the westernmost extension of the parent St. Louis – San Francisco Railroad which until now extended only as far west as Texas.

Eugene Spencer then presented a silver spike. His great-grandfather, a U. S. Commissioner, presented a silver spike on behalf of Nevada at the Promontory Point ceremony. Finally, Robert Hoffman presented the appropriate spike from the Golden State. The ceremonial spikes were driven and the work certified by Lewis, the only railroader present who makes a living at it!

Bill Cooper aboard his 1869 4–4–0 touched pilots with the home road 4–6–2 to complete the ceremony. Bill has been building steam locomotives, large and small, since 1900.

In the next two hours Morry Abowitz, a fully-attired Stationmaster, loaded 320 passengers on a succession of trains drawn by Bill Cooper's 2–4–2T, son Albert Cooper's heavy 4–6–2, Bill Divine at the regulator of his free-lance English 2–4–0 and the Frisco Pacific.

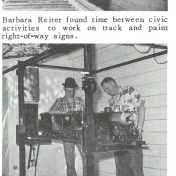
The day was a success by any standards: the owners, their hard-working friends and 600 guests had launched a railroad in the grand tradition. And Gene Hackley secured excellent press coverage to further improve the public image of Live Steam.

Ken on the 1042 and Bill Cooper on his 1869 4–4–0 prepare to touch pilots at the Golden Spike Ceremony. Kneeling (l to r) are Gene Spencer (whose Great-Grandfather participated in the Promontory Point Ceremony), Dr. Reiter driving the Golden Spike, D. R. Lewis (Assistant to Vice President S.P.R.R.), Harry C. Gruwell (Master of Ceremonies) and Robert C. Hoffman who presented the Golden Spike to the SP&TC.

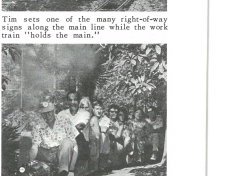
ALL PHOTOS BY GENE HACKLEY

Barbara Reiter found time between civic activities to work on track and paint right-of-way signs.

Tim sets one of the many right-of-way signs along the main line while the work train "holds the main."



Ken and Art check out the 1042 on the roundhouse elevator before lowering it to ground track level.



Bill Cooper (82 years young!) hauls passengers behind his 2–4–2T after the driving of the Golden Spike.

## OMAHA AREA LIVE STEAMERS

When *Omaha World-Herald* reporter Al Frisbie covered the activities at the River Bottom Line, the club held high hopes that the publicity would help to draw out other Live Steamers in the Omaha area. When the article appeared prominently in the September 9th edition, it was well-written and profusely illustrated. The response was almost immediate (4 days, to be specific) and came from the Nebraska State Boiler Inspector who pointed out that the state's boiler law requires anything operating at more than 15 psi must be ASME code constructed.

A personal meeting was arranged and drawings of the boilers were displayed to explain their construc-

## DERAILED BY BOILER LAW

tion. Typically, though, the meeting brought out no constructive suggestions...only blind obedience to "the law".

At a club meeting on November 10th, the Omaha Area Live Steamers voted unanimously to continue construction of the club track and, most of all, to continue with building of the locomotives. Two of the members have 1" Pacifics under construction and three new members brings the club roll to 7 with 4 more prospects.

Anyone who has had experience with this type of situation should contact Robert Recic, Secretary of the Omaha Area Live Steamers at 4022 South 93rd Circle, Omaha, Nebraska 68127.

## THIRD CALL FOR MAPS

At this writing only two clubs have submitted maps showing location and access routes to their tracks for use in the Directory of Live Steamers.

We'd like to make this booklet as useful as possible and feel that inclusion of such information would be an asset to traveling Live Steamers. With work under way on this Directory, and a desire to get them distributed by this spring, this material will be needed very soon in order to plan page layout, material requirements and space allotment in addition to preparing the art-work.

How about making this the first order of business at each club meet in January?

## NEW LIVE STEAM CLUB IN ST. LOUIS

Word has just been received about the newest in the growing list of Live Steam Clubs.

The St. Louis Live Steamers are an initial group of ten men in the St. Louis, Missouri, area, 9 of whom have locomotives.

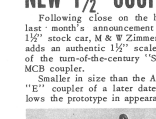
The club meets on the second Friday of each month at different members' homes and the secretary is Leo Myers, 8121 Stratford Drive, Clayton, Missouri 63105. Contact Leo if you are interested in joining this interested group of Live Steamers.

NEW PRODUCTS NEW PRODUCTS

## NEW 1½" COUPLER

Following close on the heels of last month's announcement of the 1½" stock car, M & W Zimmer Models adds an authentic 1½" scale replica of the turn-of-the-century "Simplex" MCB coupler.

Smaller in size than the AAR type "E" coupler of a later date, it follows the prototype in appearance and



will mate with accurately-scaled models of more recent designs.

Information about this coupler as well as an extensive list of available castings for 1½" scale cars and locomotives may be had for 25¢ from M & W ZIMMER MODELS
Post Office Box 340
Argo, Illinois 60501

## FLORIDA STEAM & GAS ENGINEERS MEET FEB. 10-11

The first annual two-day meet of the Florida Steam & Gas Engineers will be held at the Bradenton-Sarasota Speedway on February 10th and 11th.

There will be model and full-size steam engines, locomotives, restored gas engines of all sizes up to full-size Rumley Oilpull Tractors. A boiler and steam manifold with 1/8" and 1/4" outlets will be available.

Dinner will be served each day with cold drinks and coffee available all day.

## The Steam Locomotive In 1838

A new book of interest to Live Steamers is being offered by Glenwood Publishers, whose earlier offering of *American Locomotive Engineering* was well received by the hobby.

*The Steam Locomotive In 1838* is a reprint of four detailed engravings and the complete text covering "Stephenson's Patent Locomotive Engine" taken from the London Edition of 1838, published by John Weale, titled *The Steam Engine: Its Invention and Progressive Improvement.*

In reproducing the text, original pages were reduced in size. In order to present diagrams and drawings on these pages in the scale indicated in the text, additional reproduction of diagrams and drawings only, in the exact dimensions of the original volume, are included.

The book is 9 x 12 inches, 32 pages. The four engravings are loose-bound in a pocket and fold out to 12 x 24 inches, suitable for framing.

Order your copy of this soft bound book from LIVE STEAM. Only $2.50 per copy.

## Scheduled Meets

### FEBRUARY

**10 FLORIDA STEAM & GAS ENGINEERS**
**11 First Annual Meet**
Bradenton-Sarasota Speedway
J. R. Gormley, Secretary
Post Office Box 147
Dunedin, Florida 33528

### REGULAR RUN DAYS

**GOLDEN GATE LIVE STEAMERS**
Every Sunday, Weather Permitting
2½" – 3½" – 4½" – 7½" Gauge
Joseph W. Bryan, Secretary
1225 Scott Street
El Cerrito, California 94530

**JAMUL VALLEY RAILROAD CLUB**
3rd Sunday of each month
7½" Gauge
Charles Underhill, Secretary
4675 Coronado Avenue
San Diego, California 92107

**LOS ANGELES LIVE STEAMERS**
1st Saturday & Sunday each month
3½" – 4½" – 7½" Gauge
W. Ron Crawford, Secretary
6900 Royer Street
Canoga Park, California 91304

**NEW JERSEY LIVE STEAMERS**
1st and 3rd Sundays each month
3½" – 4½" – 7½" Gauge
Ralph Green, Secretary
865 Kilsyth Road
Elizabeth, New Jersey 07208

**SOUTHERN CALIFORNIA LIVE STEAM CLUB**
3rd Sunday of each month
3½" – 4½" – 7½" Gauge
K. G. Kepner, Secretary
2764 Maple
Rialto, California 92376

PART FOUR

# MACHINING STEAM ENGINE PISTON RINGS

by Garold B. Kubicek

SO YOU WANT TO BUILD A LIVE STEAM LOCOMOTIVE

by Joseph F. Nelson

CHAPTER 7

*Garold B. Kubicek, a graduate electronic engineer employed as an instrumentation engineer, controls engineer and consultant in the aerospace industry, has set up these instructions and tabulations for the machining of piston rings for small steam engines. He has built working models of one sort or another over most of his life. A trip to England in 1950 established a lasting interest in Live Steam locomotives which, as a POW in Korea, enabled him to pass what would have been many dreary hours, designing and detailing steam locomotives. Since then, Gary has belonged to the GGLS, SCLS and the LALS Steam Clubs. He was instrumental in starting the Los Angeles Live Steamers and is a charter member.*

*Gary has collected many tools and electronic instruments over the years and has just completed his new shop adjacent to his garage. Although Live Steam locomotives are his major interest, he does spend much of his time on building tools, telescopes, electronic equipment and computers. He is at present building a 1½" scale free lance Pacific and has started construction on a 1½" scale Mallet. The Baker valve gear is Gary's favorite; he is strong for piston valves; and believes in hard fuel. Gary is more than willing to share his technical knowledge of Live Steam equipment with others.*

## MACHINING STEAM ENGINE PISTON RINGS

Why machine piston rings when they can be purchased? First, some people just naturally like to make things; and second, most piston rings available today are for use in the internal combustion engine and must seal against pressures as high as 1,000 pounds per square inch (psig). These rings are designed with wall pressures that may exceed 40 psi but, for steam engine use, a wall pressure of 3–5 psi is sufficient, and any excess pressure simply results in unneeded friction which robs the locomotive of power. The effort to make suitably dimensioned piston rings is worth while and will result in a free-running engine. On steam locomotive locomotives, the ring is only touching the piston or piston valve cylinder walls and when installed in properly designed and constructed pistons and piston valves, years of steam-tight and trouble-free operation are to be expected. Such rings are in the valves and cylinders of this author's ½" scale Pacific and for over 11 years have been steam-tight and free, and are still so. This engine has many actual miles to its credit.

The following methods of size determination are not new, but they were checked from an engineering standpoint before they were adopted for use. Over 100 successful piston rings have been made by this author using this method.

Small piston rings are very fragile and it is practically impossible to install them over the piston or valve without breakage. Because of their fragile nature, small rings are designed with greater thickness (with resulting greater wall pressure) and it is, therefore, recommended that built-up pistons and valves be fabricated if these small rings are to be used. Typical piston valve bodies are illustrated elsewhere in this chapter. For any ring to work steam tight, careful fitting is required. The two sides must be parallel and should have no more than 0.001" side clearance in the groove. The cut must allow for expansion, yet remain as small as possible and, also, each ring must float freely in the slot. These conditions must be met for successfully operating piston rings.

The necessary dimensions for most commonly required piston ring sizes are given in the accompanying table. Any odd size may have its dimensions determined by extra-polation from data given in this table. Ring width is not too critical; however, good practice dictates between 1/16" width for small rings to 3/16" width for the larger rings.

## PROCEDURE

Securely chuck a piece of good quality grey cast iron, nickel iron, or Mehanite in the lathe. Turn to initial outside diameter (Col. 6) and then bore to the initial inside diameter (Col. 7). Bore deep enough to make six to eight rings. This means six to eight by the width of the rings plus six to eight by the width of the parting tool plus ½". Do not bore through. When facing, take a light cut with a fairly fine feed to get a smooth finish. Part off the first ring to width plus 0.015". Face off each end before cutting off the remaining rings.

## FABRICATION AND USE OF FACING FIXTURE (See Drawing)

The facing fixture may be made from any metal available. Any of the aircraft aluminums will be satisfactory; however, do not use dead soft aluminum.

Clean the inside of the collet and insert the ring, faced side in. Make certain that the ring is fully seated in the collet by tapping it lightly with a soft mallet as the chuck is tightened. Face to width and then check for parallelism.

Place the ring in a smooth jaw vise (or use copper or aluminum jaw covers) leaving enough of the ring showing so that it may be cut through. Cut through with a jeweler's saw and then file gap until the width is the same as the calculated width in Column 5 (use a feeler gauge with the ring out of the vise and strain removed). Make certain that the sides of the cut are as straight and parallel as possible.

After the slot has been cut to correct size, a wire smaller than the width of the ring is wrapped around the outside of the ring and the two ends twisted together until the ring gap closes. This compresses the ring but allows it to take a normal shape in respect to internal stresses. This applies to concentric piston rings and not to eccentric rings. Eccentric rings are not practical in a horizontal engine unless they are pinned in position.

## FABRICATION AND USE OF RING FINISHING ARBOR (See Drawing)

Turn the complete arbor in one setting since the chucking end must be concentric with the rest of the arbor; or better yet, turn the rings with the arbor on centers. When loading the arbor, make certain that all

the rings are placed on the arbor with the slot down. This, due to the clearance between the arbor and the rings, will make the rings slightly eccentric. This tends to provide a more even wall pressure around the circumference of the ring.

After tightening the nut, the wires around each ring may then be cut since the rings will remain closed due to end pressure. If the rings are turned on centers, make certain that the headstock center runs true. Turn the piston rings to their final O.D. with light cuts and fine feed; remove the rings from the arbor; and proceed to the next group. The rings should be placed in their cylinders and checked for gap which should be 0.002". (Check with a feeler gauge.) If the gap is tight, a few light touches with a fine file will bring the gap to the proper dimension. Deburr the rings by drawing them lightly across #600 grit emery cloth, making certain to remove the burrs at the ring gap. This is a delicate operation, so go easy. The rings are now ready for installation. CAUTION! Cast iron rings are easily broken.

## TABLE OF DIMENSIONS FOR CAST IRON PISTON RINGS

All Dimensions In Inches Except Wall Pressure

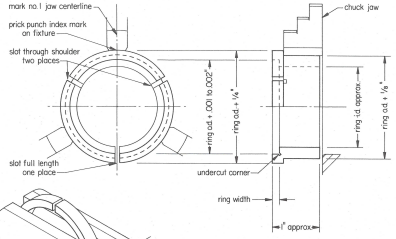
| Finished Compressed O. D. | Finished Wall (t) | Finished I. D. | Squeeze O.D. In | Width Of Gap | Initial O.D. | Initial I.D. | Wall Pressure P.S.I. |
|---|---|---|---|---|---|---|---|
| 0.375 | 0.029 | 0.317 | 0.385 | 0.010 | 0.388 | 0.320 | 20 |
| 0.500 | 0.033 | 0.434 | 0.513 | 0.016 | 0.518 | 0.439 | 15 |
| 0.625 | 0.034 | 0.557 | 0.641 | 0.024 | 0.649 | 0.565 | 10 |
| 0.750 | 0.041 | 0.668 | 0.768 | 0.028 | 0.777 | 0.677 | 10 |
| 0.875 | 0.048 | 0.779 | 0.894 | 0.033 | 0.905 | 0.790 | 10 |
| 1.000 | 0.055 | 0.890 | 1.020 | 0.037 | 1.032 | 0.902 | 10 |
| 1.125 | 0.058 | 1.009 | 1.147 | 0.045 | 1.161 | 1.023 | 9 |
| 1.250 | 0.061 | 1.128 | 1.273 | 0.053 | 1.290 | 1.145 | 8 |
| 1.375 | 0.062 | 1.251 | 1.399 | 0.063 | 1.419 | 1.271 | 7 |
| 1.500 | 0.063 | 1.374 | 1.526 | 0.073 | 1.549 | 1.397 | 6 |
| 1.750 | 0.067 | 1.616 | 1.778 | 0.094 | 1.808 | 1.646 | 5 |
| 2.000 | 0.077 | 1.846 | 2.032 | 0.106 | 2.066 | 1.880 | 5 |
| 2.250 | 0.086 | 2.078 | 2.286 | 0.121 | 2.325 | 2.117 | 5 |
| 2.500 | 0.096 | 2.308 | 2.538 | 0.133 | 2.581 | 2.351 | 5 |
| 2.750 | 0.106 | 2.538 | 2.794 | 0.146 | 2.841 | 2.585 | 5 |
| 3.000 | 0.115 | 2.770 | 3.048 | 0.160 | 3.099 | 2.821 | 5 |

### EQUATIONS USED FOR CALCULATIONS

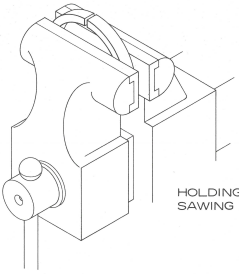
1. $t = 3.47 \times r \times \sqrt{q/S_o}$
2. $e = \frac{2.4D^3}{t} \times \frac{S_o}{E}$
3. $S = \frac{eEt}{2.4D^3}$
4. $q = \frac{S}{12} \times \frac{t^2}{r^2}$
5. t = Wall thickness of ring in inches
6. S = Stress in metal due to bending
7. D = O.D. of finished ring when compressed
8. e = Amount to cut from ring wall
9. E = Modulus of Elasticity
10. q = Wall pressure in pounds per square inch (P.S.I.)
11. r = Radius of compressed ring
12. $S_o$ = Stress in metal after turning ring to size

Let: S = 12,000 P.S.I.
$S_o$ = 10,250 P.S.I.
E = 12,000,000 P.S.I.

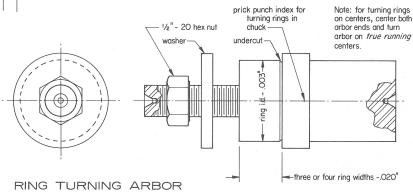
NOTE:
Dimensions of rings not given here may be found by using the equations or by extrapolation, i.e.: Estimating the difference in dimensions between the rings to be made and adjacent dimensions in the table based upon the finished compressed outside diameter of the rings.




RING FACING FIXTURE



HOLDING RING IN VISE FOR SAWING AND FILING CUT




Note: for turning rings on centers, center both arbor ends and turn arbor on *true running* centers.

RING TURNING ARBOR

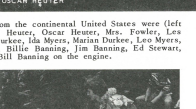
JFN/wct

# 5th Anniversary in the 50th State

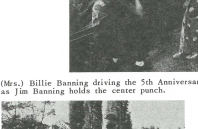
by James Banning

PHOTOS BY OSCAR HEUTER

Live Steamers from the continental United States were (left to right) Nadine Heuter, Oscar Heuter, Mrs. Fowler, Les Fowler, Dwight Durkee, Ida Myers, Marian Durkee, Leo Myers, Jeanette Stewart, Billie Banning, Jim Banning, Ed Stewart, Art Stewart and Bill Banning on the engine.



(Mrs.) Billie Banning driving the 5th Anniversary Gold Spike as Jim Banning holds the center punch.



Talking it up on "Suicide Curve" (12-foot high trestle.) New in January 1959, the engine has run 475 actual miles, steamed 488 hours, carried 3,425 passengers and consumed 1,000 pounds of coal. At 3 gallons of water per pound of coal it has evaporated 3,000 gallons of water!

On a beautiful October afternoon in one of Oahu's most picturesque valleys, a steady rise of smoke which smelled suggestively of coal (coal in Hawaii??) heralded the coming to life of the only operating steam locomotive in the state! The trade winds were just right, the trees and grass were in deep green and the yard and tracks were cleaned to a fault. This was an important day in the life of the "Oahu Railway" ... the Fifth Anniversary meet was just a scant hour away and last-minute hustling and checking seemingly endless details were slowly taken care of in one way or another. That last hour before a large crowd arrives always goes by too fast and the engineer wonders what has not been done that must be done.

At precisely two o'clock, though, Gold Spike #2 is lifted from its gleaming box and held aloft for all to see. The spike was the gift of Harry and Sally Dixon in Castro Valley, California. Harry has been Pacific Coast Secretary of the Brotherhood of Live Steamers for many years and is no stranger to Live Steamers. Mrs. Banning drove the spike and the 1" Pacific made a run over that section of track. The festivities were not over, though, for the spike-driving was followed by the burning of the mortgage on the Banning's home!

The balance of the afternoon was spent in running the train consisting of four cars and the caboose (#22 or #27, depending upon which side of the train you were looking at!) Amid the slipping of drivers, pleading of the engineer and prayers of the passengers the train carried an estimated 100 to 150 passengers up and down the ruling 4½% grade totaling five actual miles and consuming 20 lbs. of coal and evaporating 40 gallons of water.

A large tent was erected on the upper part of the yard and three very pleasant Japanese ladies served sandwiches and punch to the 175 or so guests who attended the festivities. Several attended from the Mainland but the Harry Dixons, the Gordon Corwins and the Bill Bays were missed. They, too, had attended the original Gold Spike Ceremony five years ago.

All in all everyone had a great time!

# Trolley Museum Begins Live Steam Runs

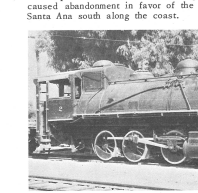
Photos and Report by Joel Tedder

Two Southern California museum groups, owning three 0–6–0T switch engines between them, are completing preparations for Live Steam runs at the Orange Empire Trolley Museum at Perris, California. Plans are for the Pacific Southwest Railway Museum Association and the California Southern Railway Museum to run on alternate weekends through the 1967–68 Winter and Spring Seasons.

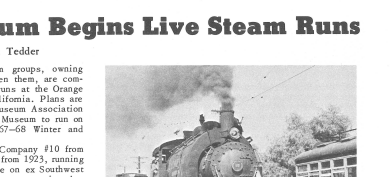
PSRMA has ex E. J. Lavino & Company #10 from Sheridan, Pa., an Alco engine dating from 1923, running now. A little more work must be done on ex Southwest Portland Cement Company #3, a Davenport engine, before it can be taken out.

CSRM has ex Southwest Portland Cement Company #2 from Victorville, California, another Davenport, tested and running but has just a little more work to do on the cab and other minor equipment.

The right-of-way was acquired by CSRM and is part of the original California Southern Railroad . . . the first transcontinental link to San Diego. The line was later purchased by the Santa Fe and used as their main line until repeated floods in the Santa Margarita River Canyon caused abandonment in favor of the present line from Santa Ana south along the coast.



Former Southwest Portland Cement Company #2 is now owned by the California Southern Railroad Museum, Inc. The engine is Davenport #1584, is oil-fired and has boiler approval. A new cab roof and minor service will ready the engine for steam fan runs on alternate weekends at the Orange Empire Trolley Museum.



Pacific Electric "Red Car" takes the siding at Orange Empire Trolley Museum to let Alco 0–6–0T make a round trip on the Main Line with a load of museum visitors. Cars are ex Santa Fe gon and Southern Pacific caboose #570.

OETM leases rights from CSRM and the three groups are all involved in laying and maintenance of the track. Although only a few hundred feet of "Main Line" are in, plans are to lay track from the ATSF Depot at Perris to Railroad Canyon Reservoir, a distance of approximately five miles.

OETM will be running one or more street cars every Saturday and Sunday, leaving the track at regular intervals for a round trip steam train trip. There is a book store at the museum, picnic tables under the pepper trees and refreshments are available.

There is a lot more activity and both street railway and steam railfans are urged to come out. Increased member support is needed and there is a work project for anyone interested. Rides are supported by contributions taken at the loading platform.

There has been rumor that this route may be revived as a freight line to serve industry expected to locate south of Perris which could mean eventual return to Santa Fe ownership. The museum groups are confident, however, that arrangements can be made for dual use of tracks, continuing the steam and electric runs on weekends.

## ABOUT THE NEW LOOK ON THE FRONT COVER

You didn't notice it? It's rather inconspicuous, we'll admit, but nevertheless it is there. We're referring to the change from 35¢ to 45¢ in the upper left-hand corner of the cover and the corresponding change in subscription rates at the bottom of the first column on page 2.

The original subscription rate was an arbitrary amount established by conjecture rather than experience. With 17 issues behind us, two increases in paper costs and some hind-sight to balance our fore-sight, this new rate will be more realistic. Postal rates, too, are scheduled to increase on our shipments as of January 7th.

We purposely held off until this January issue in order to give our original subscribers the benefit of a second year at the old rate. By far the greatest number of our subscriptions begin with the September issue with less than 50 renewing in January and less than 20 in May. We will be concentrating, too, on a better balance there with some advertising to increase circulation of LIVE STEAM.

The new rate will apply to new subscriptions received after January 1st, 1968, and to renewals beginning with the May 1968 issue. They will be $4.50 per year in the United States and Canada (U.S. Funds) and $5.50 per year (U.S. Funds) elsewhere.

What's coming up in the months ahead? We will soon begin the series on construction of a 3½" Live Steamer. We will be including Detail Sheets frequently to show how to build such things as a rail-bender; a lathe tool-holder to simplify production of small parts which are formed, cut off and then repeated. We hope this approach will encourage readers to submit ideas which can be used without requiring text to support or explain them.

We have an article on whistles on the drawing board and an article scheduled for February that will (at last) give you something to build! LIVE STEAM will keep "chugging!"

# mail stop

## THOUGHTS ON COMBUSTION CHAMBERS

*(The following open letter appeared in the October 1967 issue of the "Live Steamer" published by the Johannesburg (South Africa) Live Steam Club. The subject will interest many readers and, we hope, will bring forth comments in future "Mail Stop" columns. Ed.)*

Thinking over our discussion on combustion chambers the other evening, here are my reasons for saying that they were unnecessary on big boilers and you can judge for yourself. The fact that only about the first third of the tubes actually generate steam in any quantity is too well known for me to have to prove it to you, so working on this basis, the effective length of the tubes in my 16E will be 5.66 inches (12" between tubeplates). There will be thirty-two $\frac{1}{2}$" dia. tubes and the combined heating surface over this length will be 284.5 square inches. The heating surface of a combustion chamber the same length will be about 80 square inches plus a small increment of about 50 square inches from the strut tubes, a total of 130 square inches. It is not quite half the heating surface I am getting from the tubes, and remember, it is heating surface that generates steam. Even allowing for the greater heat from combustion in the chamber, it would have to be double the heat entering the tubes, which is manifestly absurd.

It might be argued here that the use of a combustion chamber will push the effective tube length into the second third of the tubes, but this is not so. A large amount of the heat from combustion will have already been absorbed through the walls of the chamber and strut tubes and the heat entering the firetubes will not be nearly as high as it would be coming directly from the firebox.

In the case of big engines, they are only installed to reduce the length of the fire tubes, or more important, ensure more complete combustion of the gases, hence their name. If we cannot ensure the latter in the huge fireboxes of our 15F and 16E locomotives then there is something radically wrong with our draughting arrangements.

Another point to consider is this: once they are installed and in use, it is virtually impossible to clean them out, especially if strut tubes are used. As a result, they get a progressively thicker deposit of carbon and soot which reduces the effectiveness of the heat transfer, whereas the tubes can be completely cleaned.

Taking all the above into consideration, I cannot see any justification for installing a chamber on a boiler of this type as applied to a 16E locomotive either in full size or minature. On a 15F there would be some justification for it, but only to keep the tube length within reasonable limits.

As far as I can recall (and I may be sticking my neck out here) L.B. S.C. was the first to introduce combustion chambers in our small boilers. At that time, $\frac{1}{2}$" scale was the normal scale to work to, and owing to the large tubes required in a small boiler, he couldn't get the heating surface without them. It was a logical step to obtain the greater surface required, and as a result the boilers steamed like nobody's business. Because of this, it became the accepted design for all boilers and adapted as standard practice. In the small locos of that time it worked, and worked well, and many a loco which might not have been a success without it, turned out to be a real humdinger.

Today things are slightly different, $\frac{1}{2}$" scale is taking a back seat to 1" and even $1\frac{1}{2}$" scale locomotives are becoming common. Nobody bothers to question combustion chambers on these big engines, "it's the thing to do", so we still find them being used irrespective of the fact that with the larger number of flue tubes being used, a greater heating surface can be obtained without them, and as I said before, it is the heating surface which produces the steam. In the smaller scale boilers with a small number of large tubes, I am all for them, but in larger boilers with comparitively small tubes, they are not necessary except in certain circumstances. No. C.M.E. of any railway would use combustion chambers if he could avoid it. The cost of manufacture was heavy and as for maintenance —— !

Regarding arch tubes, the gain from these in our small boilers does not warrant the extra work involved. In the big jobs they are intended to improve the circulation and support the brick arch, an important consideration on wide firebox engines, but there is not the same need for improving the circulation in our small boilers as there is only a minute fraction of the water to be stirred up in comparison. Also they are liable to burn through unless thick-wall tubing is used, which reduces their effectiveness. Unlike the big jobs, they are not filled completely with water. You cannot scale a fire or heat and by the time the water is well up the tube it has been converted to steam, and dry steam at that. The upper end is virtually a superheater tube, and those burn out all too easily even though not in direct contact with the flames.

My contentions regarding combustion chambers have been amply proved on Green Goddess. It has no combustion chamber and no arch tubes and I have difficulty in keeping the steam from blowing off, and that is a narrow firegrate engine. It has 22 7/16" tubes and the distance between tubeplates is 14-7/8". It steams like a witch.

Well there you have it. Now let us see if anyone can come forward and tell me my reasoning is at fault. I would welcome any such letters as they would provide food for thought and interest for all of us. To me, it is just a matter of plain common sense, irrespective of other people's theories and ideas, and blind acceptance of them.

D. FRANK HOLLAND
10 SURREY ROAD
KENSINGTON,
JOHANNESBURG,
SOUTH AFRICA

# ...from the cupola

In reading over the report and letter from Bob Recic in Omaha about their difficulties with an ancient boiler law, (reported elsewhere in this issue) it seems that there is a real need for some assistance on some of the problems that confront Live Steamers.

Perhaps the hobby could use a Blue Ribbon Committee of men versed in legal matters to determine, for example, which states still have a need for revision in their laws to protect the interests of Live Steamers. A group composed of volunteers from various parts of the country could compare notes and, if they desired, could submit their findings to LIVE STEAM for publication as general information to the hobby. Any interested parties (and we hope there will be several) can contact LIVE STEAM and we will arrange to get them in touch with one another.

There is, of course, another side to this coin, too. Perhaps it is high time that Live Steamers took some positive steps to see that the hobby is adequately protected from possible injurious publicity by setting up some basic rules to protect against accidents. We think particularly of boiler inspections, safety chains, positive couplers, and brakes on larger-scale equipment.

The Live Steam hobby is growing. Perhaps it is more obvious right here than anywhere else because we get letters and subscriptions just about every day from Live Steamers or potential Live Steamers that were not included in our file of some 3,000 Live Steamers known to us. It's a good time to give some serious thought to the future of our hobby so that we avoid all possible pitfalls that laxity could cause us to stumble into. Any volunteers to get this phase of the activity under way?

–W.C.F.–

**SAFETY FIRST**
**is not a slogan. It is**
**RULE ONE**
**in Live Steam**


**THE EXTRA BOARD**

Items for sale or wanted to purchase by hobbyists. One free ad included with subscription, additional ads 5¢ per word with order.

WANTED

1" scale turbo-generator for locomotive. Prints, parts or complete. Keith Smith, 1820 Norwood Lane, Arlington, Texas

3½" gauge steam loco. State price and condition, or have 1920? Model T Ford light delivery to swap. In Massachusetts vicinity. Putnam Clark, 102 Village St., Millis, Mass. 02054.

Used plans for 1½" scale Mogul with Walschaert valve gear. State price, condition, etc. John Bauerle, 208 S. West St., Mansfield, Ill. 61854.

Locomotives in ¾", 1" or 1½" scale, complete or incomplete. Send details with photo and asking price to Pleasant Valley R.R., 5 Councilman Avenue, Baltimore, Md., 21206.

Electric Trains made before 1941. Will pay top cash. Also want Buddy-L push toys. Al Stauter, Route 4, Medina, Ohio

FOR SALE

One set 48 slides "Locomotives of Yesterday" 1850's to 1890's. Now cost $6.65, sell for $5.00 postpaid. John Bauerle, 208 S. West St., Mansfield, Ill.

Drawing of S.P. 4–8–2. Send S.S.E. for price. Jack M. Fesco, 4309 Edenhurst Avenue, Los Angeles, Calif. 90039.

15" gauge 4–4–0 Cagney type locomotive chassis almost complete, no boiler. Write for photos and details. Price $400.00. A. H. Wise, Route #1, New Concord, Ohio 43762.

Horizontal Stationary steam engine, 2½" x 3" bore, long, $90.00; 4–4–0 Juliet 3½" gauge, slip eccentric reverse gear $250.00; 4–6–4 Hudson ¾" scale, excellent runner, no trader, $650.00. David Sobel, 93 Garry Road, Closter, N. J.

One double-cylinder steam car engine, 2½ x 3½ bore and stroke, with reverse and in good running condition. Write for photos and details. Price $200.00 A. H. Wise, Route #1, New Concord, Ohio

1½" scale truck castings $40.00 per pair. Photo 25¢. Ben Nixon, 927 Woodland, Southampton, Pa., 18966.

1½" scale Atlantic 4–4–2 Live Steam locomotive for sale. Detailed information by return mail. Mrs. R. C. Fleming, 142 Kern St., Taft, Calif.

Accurately scaled 115 lb. A.R.E.A. extruded aluminum rail in 1½" scale, 16¢ per foot in lots of 250 feet. Also extruded splice bars and extruded tie plates to match. Send 25¢ for samples and information. Paul B. Culp, 617 Panshawe St., Philadelphia, Pa., 19111.

1½" scale 7½" gauge 4–6–4 oil burner, 12" steel boiler, steam operated water pump and 0V generator, excellent steamer. Mrs. Raymond Teerling, 15856 Via Cordoba, San Lorenzo, Calif. 94580, phone 415 – 276-7768.

RUTLAND DRAWINGS

1½" scale elevations and sections of RUTLAND RAILROAD class F–2| 4–6–0 engines. For information write to:
**Walter H. Allen**
962 Greenland Road
Portsmouth, N. H., 03801

1½" scale trucks, couplers, brake pockets, frogs, drivers, etc. Send 25¢ for photo and information
**EVERT BRUMLEY**
Route #4, Box 222
Winchester, Indiana 47394

LOCOMOTIVES BUILT TO ORDER
Machined to any stage
**Torn's Machine & Engineering Co.**
808 McPhaul Street
Austin, Texas 78758

¾" – 1½" Scale
Castings, Blueprints and Materials
16 Engines in CATALOG #3 – $1.00
**FRIENDS MODELS**
**R.F.D. Topsfield, Mass. 01983**

3/4" SCALE NYC HUDSON
Castings, drawings, freight trucks, wheels, bolsters, springs. Write for list.
**CARL HOFFMAN**
**25 Thorndale Crescent**
**Kitchener, Ontario, Canada**

**MODEL BOILERS**
Built and Repaired
Also Boiler Parts Formed Out
**MODEL BOILERS**
Box 178 Ventura, California 93001

*Blackline prints from original Cooke, Manchester and Rhode Island Works tracings. Send 50¢ for the lists of drawings.*
C. A. PURINTON
R.F.D. Boxford, Mass. 01921

**Photos, 1½" scale erection drawings 10 CNR-CPR-T&H tracings from MLW-CLC-Lima tracings, CNR Standard Detail drawings, miscellaneous prints. CATALOG 12-35¢ contains diagram sheets of all locos.**
WILLIAM DYKEMAN
890 Bay Ave., Bathurst, N.B., Canada

MINIBOLTS – Perfect little hex head miniature machine bolts in Mild Steel, Brass and Stainless Steel. #0 to #12 diameters in popular and special lengths. For "factory direct" prices write to "ROB" at
**Sierra Swiss Product Engineering**
**P. O. Box 67 Fawnskin, Calif. 92333**

PATTERN SELECTION ENLARGED
¾" – 1" – 1½" scale locomotives and horizontal stationery engine. Send self-addressed #10 envelope with TEN CENTS POSTAGE for list
**Live Steam Pattern Post**
962 Greenland, Portsmouth, N. H., 03801

# Live Steam

TO HUDSON'S OLD OLD

BULK RATE
U. S. POSTAGE
PAID
CADILLAC, MICHIGAN 49601
PERMIT #108

Post Office Box 635
Cadillac, Michigan 49601

RETURN REQUESTED

Peter Spinney
36 Atlantic St.
Gloucester, Mass. 01930

**1½" Scale Cars**
Assembled or Kit Form
Castings – Metal Parts – Lumber
Complete custom building service
Catalog 25¢

**J & J MODELS**
15712 South Condon Avenue
Lawndale, California 90260

**M & W**
**ZIMMER MODELS**
**P.O. Box 340**
**Argo, Illinois 60501**

***NEW* 1½" Scale 36'-6" STOCK CAR**

Completely Assembled or Kit Form
ALSO
Semi-Assembled Kit Form
MILLED SCALE LUMBER FOR CARS AND STRUCTURES

NO RAILROAD IS COMPLETE WITHOUT A STOCK CAR

Send 25¢ in coin for information

***THE* -1900 Vintage Stock Car & Scale Lumber**

**REAL STEAM TRAINS**
**15" – 16" – 24" – 36" Gauges**

*"LITTLE TOOT"*
**Send for FREE circular**
**CROWN METAL PRODUCTS CO.**
**WYANO, PENNSYLVANIA 15695**

TIMKEN DESIGN ROLLER BEARING TRUCK KITS

Convert to 7¼" or 7½" gauge in 15 minutes. Send 25¢ for complete description and photos.

**BUCKEYE MODEL CASTINGS**
720 Waller Street
Portsmouth, Ohio 45662

1" scale trucks and car parts
Send for free list

**NELSON W. GRAY**
900 East Brighton Avenue
Jamesville, N. Y. 13078

**Live Steam Locomotives**
1966 Catalog

Just bolt 'em together

You can have a backyard Railroad completely assembled, ready to run, anytime you wish. Complete kits, all machine work done, ready to bolt 'em together. Also available as rough forgings for those a modern engines & rolling stock. In 1½" scale, 2" scale, 3½" scale, 4½" scale, 7½" scale, 10" scale, 15" scale, 24" scale. Send for catalog. FOR FOUR, STEAM POWERED RIDES. In our 100-page catalog. Price ..... $1.00

**LITTLE ENGINES**
Established 35 years
Box N, Lomita, Calif.

**"LOST WAX"**
**for LIVE STEAM**
**1" and 1½" scales**

**NEW!** BELLS
1" Scale – $12.95
1½" Scale – $16.95

1½" SCALE
PYLE NATIONAL 1" SCALE
CLASS LAMPS COUPLER
$14.95 Pair Kit – $9.95
Assembled & Oxidized
$14.95

Write for price list.

**QUALITY Castings**
505 East 18th Street
Bakersfield, California 93305

**WINTON** Live Steam Locomotives
1½" – 3" Scales
DIESEL – 1½"

3RD EDITION CATALOG. Rough or machined castings, or ready to operate locomotives, rail, accessories, gift items, plus several pages of valuable engineering data. 11 x 8½" Catalog $2.00 in U.S.A. and Canada. 3rd class postpaid. Add 50¢ for 1st class. Other countries $3.50

**WINTON ENGINEERING COMPANY - DEPT. N**
**P.O. Box 355 Danville, California 94526**
Phone day or evening – (415) 837-4368